



Pathway for UDP-SQ Biosynthesis

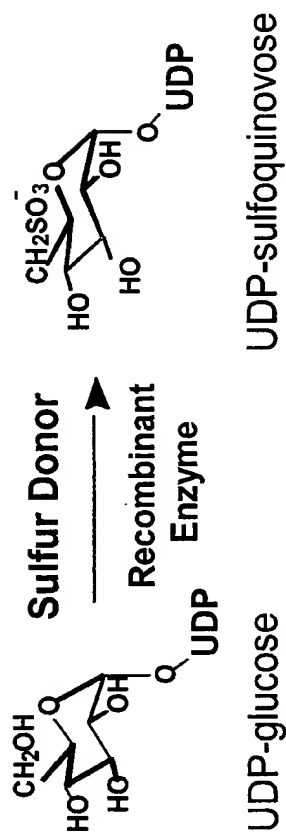


FIG. 1

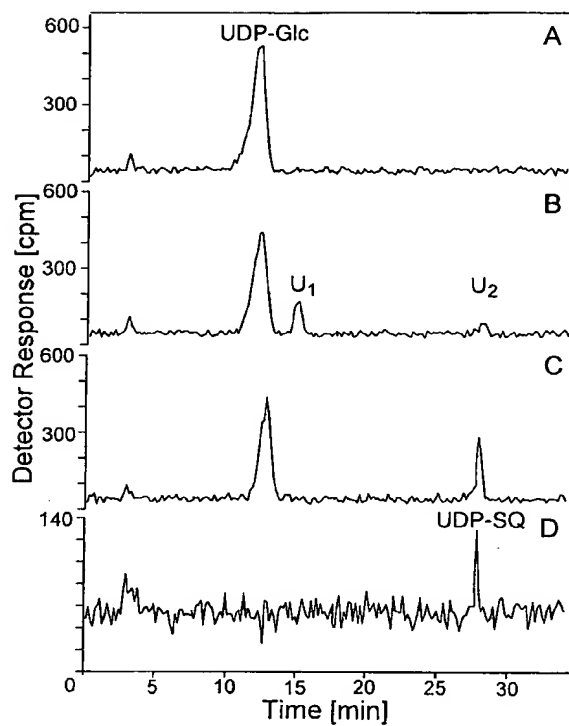


FIG. 2

pQE-30, pQE-31, AND pQE-32 VECTORS

POSITIONS OF ELEMENTS IN BASES

	pQE-30	pQE-31	pQE-32
VECTOR SIZE (bp)	3462	3464	3463
START OF NUMBERING AT <i>Xho</i> I (CTCGAG)	1-6	1-6	1-6
T5 PROMOTER/lac OPERATOR ELEMENT	7-87	7-87	7-87
T5 TRANSCRIPTION START	61	61	61
6xHis-TAG CODING SEQUENCE	127-144	127-144	127-144
MULTIPLE CLONING SITE	145-192	147-194	146-193
LAMBDA <i>t</i> ₀ TRANSCRIPTIONAL TERMINATION REGION	208-302	210-304	209-303
<i>rrnB</i> T1 TRANSCRIPTIONAL TERMINATION REGION	1064-1162	1066-1164	1065-1163
ColE1 ORIGIN OF REPLICATION	1639	1641	1640
β-LACTAMASE CODING SEQUENCE	3257-2397	3259-2399	3258-2398

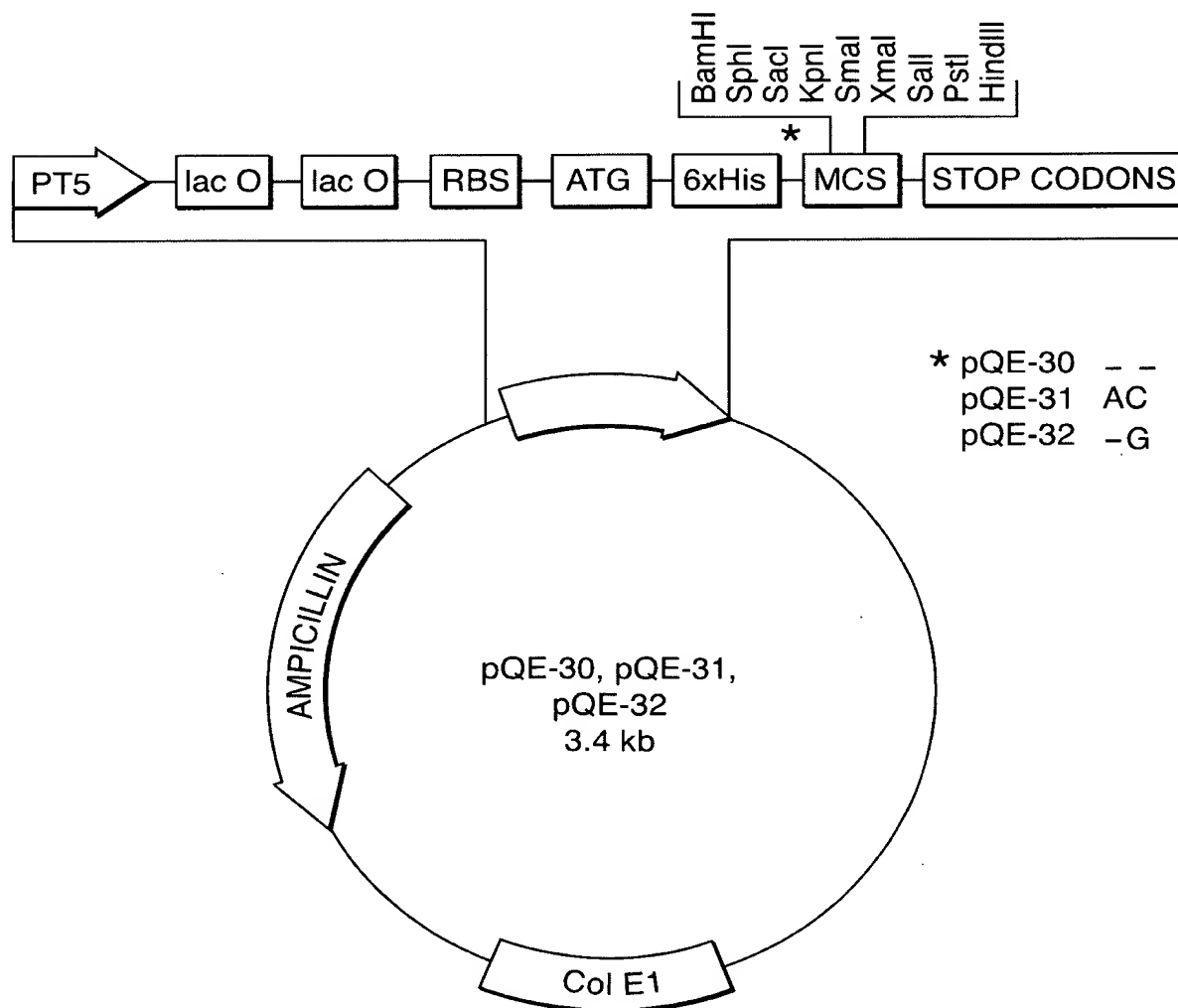


FIG. 3

pQE-30

Eco RI/RBS ATGAGAGGATCT ZZZZ 6xHis GGATCCGCATGGAGCTCGGTACCCCGGGTCGACCTGCAGCCCAAGCTT AATTAGCTGAG t₀
 RGS•His epitope

(SEQ ID NO:22)

pQE-31

Eco RI/RBS ATGAGAGGATCT ZZZZ 6xHis ACGGATCCGCATGGAGCTCGGTACCCCGGGTCGACCTGCAGCCCAAGCTT AATTAGCTGAG t₀
 RGS•His epitope

(SEQ ID NO:23)

pQE-32

Eco RI/RBS ATGAGAGGATCT ZZZZ 6xHis GGGATCCGCATGGAGCTCGGTACCCCGGGTCGACCTGCAGCCCAAGCTT AATTAGCTGAG t₀
 RGS•His epitope

(SEQ ID NO:24)

FIG. 3 CONTINUED

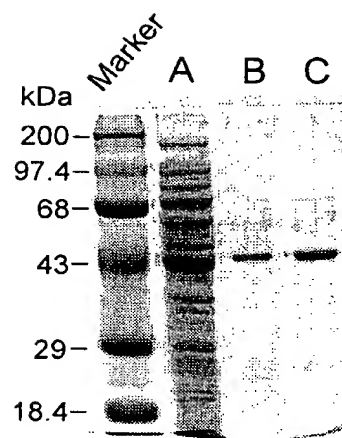


FIG. 4

Pathway for SQDG Biosynthesis

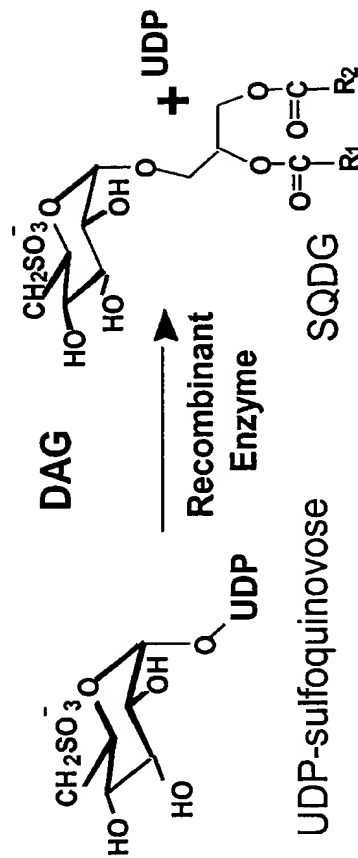


FIG. 5

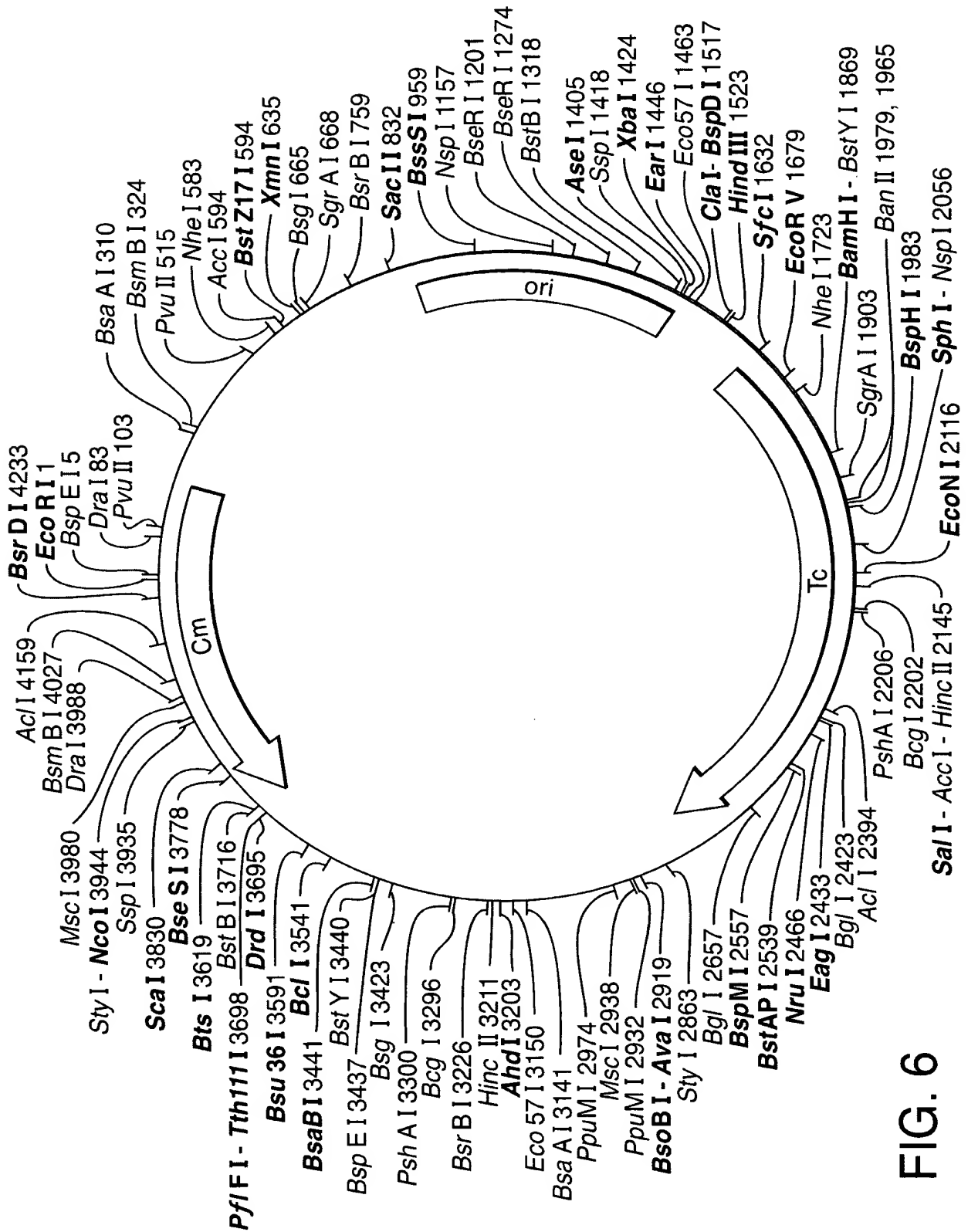


FIG. 6

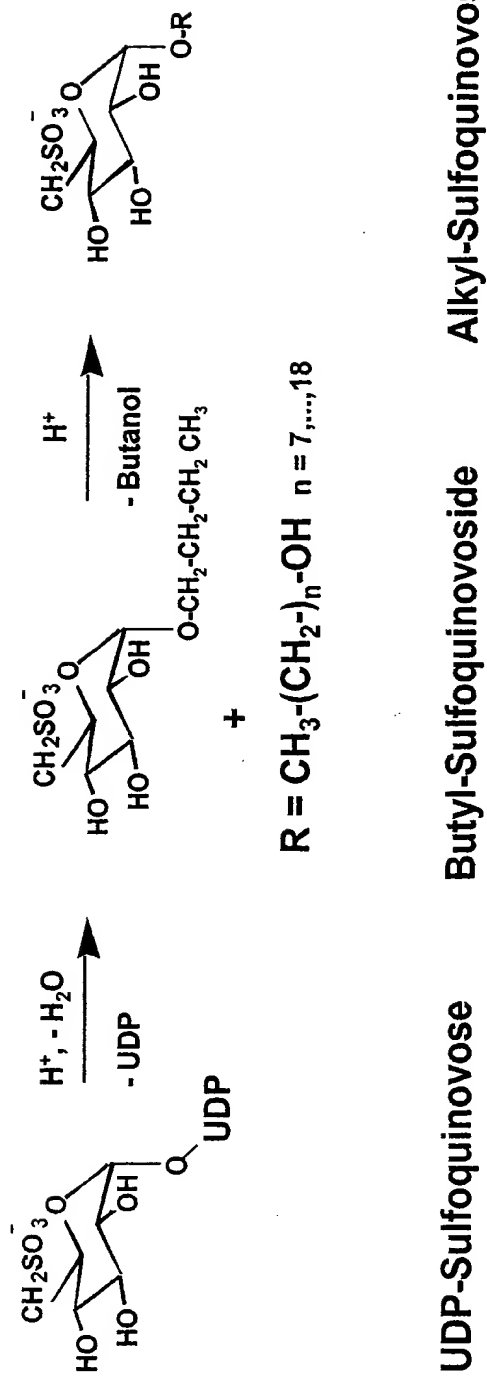


FIG. 7

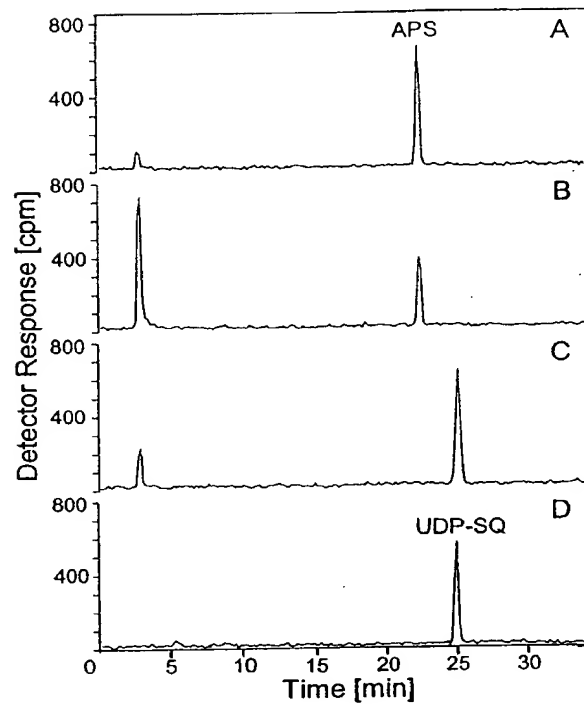


FIG. 8

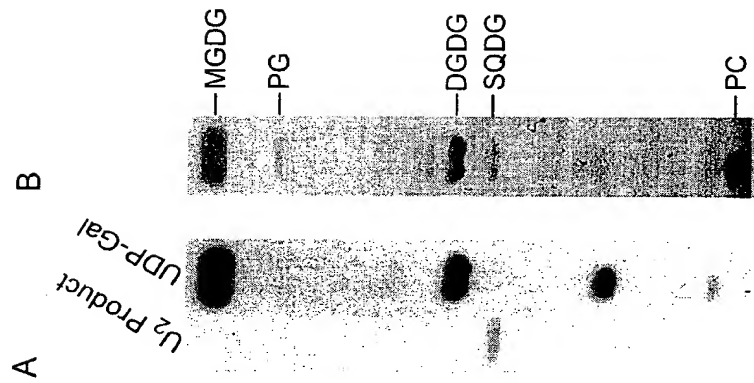


FIG. 9

SQDX

1
2-61
62-121
122-181
182-241
242-301
302-361
362-421
422-481
482-541
542-601
602-661
662-721
722-781
782-841
842-901
902-961
962-1021
1022-1081
1082-1134

tcgcgcacac
ttcggcacac
acggcgggct
cgctctatcc
ggttccggcc
actatgccaa
accttgagca
cgcataacca
atcacggcat
cagacttggc
tgttgctcta
tggatgccaa
tagagcaatt
tagggcgggc
gtctagtctt
gcatcccgga
aaggggcgat
gccaaagcgg
aggactacta

tccttttacc
ggtcgatcac
ccgcgagcac
cgagctgaag
cgacctgac
ggcgctaaat
ttacgggctg
agcagcgatc
tgagcactgt
tactgctgcg
cgtcggacgc
tcctgaggct
gtttgctggc
ctacgcttct
gctggaagcc
tattgtcagc
cgctgcgatt
tcgtcaagaa
ctgcgagggtg

gagacgttcc
ctgcagcgctc
aagggggctc
ctagcttttc
cacgtggtca
gtgccactcg
gggtcttggg
aacctctgta
tgccctctggc
atgcgcgac
ctctcagccg
tgcttggcct
acctgagcgc
gctgacgctt
atggcagcgg
gacggcatta
cagcgcttgt
gccgaacgct
tgggcagatg

tcccaaaagt
ttggccacac
gagtctatgg
cgttgccgaa
atccggctgt
tggcgctcta
agggggtgct
cttcaaccgc
agcgaggagt
gcctcagtgg
agaagcaaat
tggtcggcga
agttcattgg
ttgtctttcc
gttgtccggt
atggtttccct
tggctaacc
ggagctggaa
gttgcttacc

ggatggcatc
cgtcatggtt
ggttaaaggc
agtgggaaaa
gttggggttg
tcacacccat
ctgggaattg
gatggtgcag
ggataccgag
cgtatcgccctg
tggcccgcac
ctatctgcac
ctcccggacc
cgtggcggcc
gttcgatcct
tgcagagcgc
cgcagccacg
cttagcggcc

gtcacgcggc
ttttgccccg
tttccgctac
gccttgagc
ggcggcatct
ttgccgaaat
ctgaagctgg
gagctgacag
acctttcggc
actgcgccct
cgacctattt
cgggccgaac
ggggaacagc
gaaacccctc
aattccggtg
gaggatgaac
gagattctac
cgccaactcc

FIG. 10

AtSQDX-1

1-57	ctacacg	ttaccttccg	gtactggaaa	cagtcgttta	atcaaccaat	tgattggtcc
58-117	caaaacatga	actttctttt	tcctccagaa	ccaaatcgct	gcaactgtact	gttcatgtcg
118-177	tatctttgtc	gttgctgctc	tccaatcata	tttctcggtc	tcttctcttg	ccgcttttcc
178-237	aatgatctct	cttgtttcac	ggctgtgcag	taaagtctc	agttttgtca	cgcaatcttc
238-297	aacatctcca	gggttgaaca	aaaatccggt	ttttccctcc	tgatgaaaac	atcagaatca
298-357	gaaaaccaca	agctcaatat	aggttgaccc	ataagaacaa	tcaatgcaag	atcattttgt
358-417	gtaccagtct	atgattgaat	aaagtctcag	ttcggttaca	gctcgcttat	aagaaaattg
418-477	gcagaaaattg	ttttttcaac	catttcggtt	cggttgatat	gctcatcaat	atggtttggc
478-537	agttaattgt	aattcagata	attcactgac	ctgatcttca	gggattatat	cagggattcc
538-597	accggcacgg	gccgcgacga	caggaagtcc	tgaagacatt	gcttcaagaa	ccacaaggcc
598-657	aagtgtctcc	gactctgatg	gcatcacaaa	cacatctcca	cttgcgtaag	cttgtgagag
658-717	ttcatcgcct	tgtaacgttc	cagtgaanaac	cgctggcatt	ccggtaaaca	acttctcaag
718-777	atcctctctt	taagaaaacg	aaacagataa	acaaaattac	aatgttgttg	actagaaatc
778-837	ttcagataaac	aatatggcca	atctttaaca	aaactagtag	ttgtatggtc	catctccaat
838-897	gaaagcaatc	cgagcttcag	gtaatttgtc	cattacactg	cacacaaaatt	tctcaatatc
898-957	aaaattcgat	acaccactta	aaagaaagtga	gtccagttta	tacaaaaatc	taacctcttt
958-1017	aaaagctcca	aactcttttc	tacgccaatg	cgacctacat	gaatcactag	tggcttttct
1018-1077	ggttcgccat	tactgttaat	tacaaaaatat	taaacatcaa	gattagcgtg	gaaagtatca
1078-1137	ttgttttttaa	tgcataataa	agaaacgtat	attctaattc	tgccctcagtc	ttatacgcac
1138-1197	ttcttgagaa	cggaaacggg	gattgaaagt	ttctgaatcg	acacccttat	tccaaagtgc
1198-1257	aagttgatta	gcttcaatat	atgaaaaaaa	gaagaagaaa	atgtaagttt	tgaacaatca
1258-1317	tagagcttgt	acaaaaatgt	aatgtatgat	ctttcttcac	ctgcagttgc	accagctgct
1318-1377	ataagatctt	ttccaatggc	agcagaagga	actaatgtaa	gatcagccgc	tctgtgaagg
1378-1437	aaccctgata	aaagcatatt	caagtttagt	ttcatattat	acatcacaaat	aaaccagaaa

FIG. 11

1438-1497	aagaagaagg	aaattttgac	atttgaaaa	cgggttttac	atacttatta	tagaccacat
1498-1557	tggttttacc	aaccaactaa	aagtgtatct	tgggatgtat	ctgcacatca	acacaagcctt
1558-1617	aatcttagac	aaaaattht	ttataacaac	attgtgaaat	gaggcagaaa	aaggtactta
1618-1677	cacagggacg	tgtgtgtggt	aagacattac	tattggtaca	gatagcattt	ttgctattgc
1678-1737	cagagcacca	aagacctaag	aattttagtc	agggaaaaaa	gagagtcaag	ttctggattc
1738-1797	tctccagttc	actggtcttg	ctaattgttt	agtaattgta	attcttgagg	gattttaccat
1798-1857	aactccggga	gatgaagcgt	gtataatgtc	aggcttaaac	cgtgcaattt	cagagatgat
1858-1917	tcttggacta	agcgcaagcg	agagtggaa	cttttggtaa	taaggacaag	ggaagctaca
1918-1977	gaagagaaga	agaaattagc	gataattacca	aatagagaac	atccagtgag	taaactaaat
1978-2037	ggtgctacct	tcttgatcca	atgactctgg	ctccataaaa	ctcttcagga	acaccttcat
2038-2097	gtgtcgtcac	gactataacc	tatgaagcaa	aaaagtattt	aaaaaaaaaa	aaaaagggaac
2098-2157	agttaacact	tgtcaagtaa	ttctaattct	ggaaacagtt	acttatgagc	tgactgaaaa
2158-2217	gatacttaag	ttgaagaatg	agatagtaaa	agaagaaacc	tcgtctccca	tttcacggag
2218-2277	gtatctaagt	aaattctgga	atctgttttt	gtagccggat	acatagctgc	aaaaaatca
2278-2337	aagagagaat	cacttccaat	aataacatga	catataataa	aagcttttgg	tcaatggatc
2338-2397	ggtgattccg	agaatcttgg	gataattcaca	actaaaatct	gacaaactttg	actcaaaaca
2398-2457	atcctgaatg	taattgggtt	taacgatcta	ctatataatt	tgctaaaattg	gtggtgtagc
2458-2517	aaatttcatac	attagcgagt	atctcttcat	aaaataaatg	taacgatcaa	atcgaaagaa
2518-2577	aaaaacatta	caggaaaaag	tcaaccaagg	aaaaaaatga	gtagaatctg	ttttcacaga
2578-2637	gacatttcgt	cgaacacaaa	acaagcaaaa	aaagaacact	gtgaagaaga	cttacgcaaa
2638-2697	gggagaaggc	tcaacaaaaa	gagcaattct	cctaggctta	gagagcgact	caggatcgag
2698-2757	aagcggcgca	tcaatctccg	attcgtcatc	ttctctgact	tgagtaatag	tcatatcgtt
2758-2817	ggaccagaa	acagcttcct	ttgtaatcac	tccacagaag	cggagcttgc	ttttcttgc
2818-2877	aatgggtaat	ctccggtgac	caaacgaaag	aggggaatga	agaacaaaag	aagaagacct
2878-2937	gggaggagaa	caagagggtg	cagagggaaga	agaacaagtg	ttagtcgtgc	taggaagcaa
2938-2979	atgaggaggt	atagagagat	ttatagaaga	aagagtcgtc	at	

FIG. 11 CONTINUED

AtSQDX-2
1-50
51-110
111-170
171-230
231-290
291-350
351-410
411-470
471-530
531-590
591-650
651-710
711-770
771-830
831-890
891-950
951-1010
1011-1070
1071-1130
1131-1190
1191-1250
1251-1310
1311-1370
1371-1430
1431-1490

tcataatttg aaaaagcact tcttcttctt cttcttcttc ttcttcttct
tcttcttccc atcaaaaagt gctagtggca agaccgcgca tattccagta acaaagttta
aattcaaac tatggaacac aatttgtccc atgttttggt gcctgaatta aacgaccata
tcaattgggt cggccacttc atctcgata cgcacaaagc gttgtcaagg ttgtaaaaga
cgatttttga aggatctaca ttggcaaaag gagctttaca gacgacttga aaagtttcgg
tgtgaagatt gaaaggtaaa actttgggtt ctttgcactc ggtgaaccaa taaagcgacc
catctagata cacagggtgcg gggtaaagcag caatccgata aggagcagcg agagtgcacat
acctccaagc attggtacta aagtcgaaaa cttcgcatgt agtagcgttt tttaggccta
tttctgcaga gttgtataac caaacgggct tgtatgtgcc cctgaatttg tctttaccga
atccaagcat aaagaatttg cgtttaagct tgtagtaacc atctcgtaag tcgatcatga
gtttttgata atcgcaaaaga ggaagaggcc gataccatct agtggtcggg ttgaccacat
aaccggattt gtcgtgattg taaagacaaa cgagaccgtc acaactacta tgtgaaacta
agtacagtac gttatccttc tcccaaggag tagggatctt gaacgttgat gatgaaccca
actgcaatgt tcttaaaagt tctatggtcg ggtttataac caactaaaaat tgtatacat
ccatcagaac atctggatct cctgattgct gacgatgttt ggttgaggga aatacagaca
tttattttat taaaaagata aatatcattt tgttgggaatt ggaaaaacaa atctaaaaga
taacttttaga tatgtaagggt tcgcataatgt atttgattac attgctatga gtataatgact
cacttttcca ataataaaaa aaataaaagt gttgagtcct actaatgaag ggtaaataca
aaatttctga tcatataac aaagaaaaag cctctcataa gccaaagcca ttttactcgc
cgtaaacatc tccgcagcat actctttaca cttccttcct ctctccgcc atctctccgc
tccttcagcc acagcaacct ccataaccgc cgtcaaaagt tccacattg gcgcaaacat
aaacccaaac tcatcattca ccactatagt cctctttatg cttgcgtacc tagatgccat
cactgggtta ccaactcaaca tcgcttccat taacgttaaa tcaagacctt gtggtctaag
cgttggattc acgaacaaat cgatcccgtt gtagaaaaac ttgagctcat ttgggttag
agatcccaaa atggaaactt tttcccctaa ttccttgtaa cgttgctccc atggccctga

FIG. 12

1491-1550 tccagctact acgaggtaaa cattgaata cgttggatt atttcgga aagcttcgaa
1551-1610 gagcaatgga tgtcctttgt ctttgactaa tctcccagca gctcctaaaa caatcgctga
1611-1670 tgagttttct ggtaacccta atttgacct aaacagagta cgtagcttct tgtctgatgt
1671-1730 gaatccgttc tcgtcgactc cattgaggat cactgaacc cttttctcag ggatttggtg
1731-1790 aacgtctctt agcatttctc cgcagctatc gctgatacgc atgtggtgag cgtagttgtg
1791-1850 gaagaatctg atttcgtcca gtatcttggg aagcacggca ccgtatagac ttgcattgaa
1851-1910 gccttgatgat cttgggtcgt ctggtttacg gtcagggtct tggtaaatac ttgattgtaa
1911-1970 gctctctaac gcaatgccgt gccaggatac agcgagggtt ggaacctccc gggcgatcca
1971-2030 gtgaggtaaa gcaacacttt cagagtgaac cgcattcgaaa ggttctttct tgttttcttc
2031-2090 ttggtaaac tcccatgcct tttgtaccg ccatttccg ggctccgcgt cgccgtgaga
2091-2150 atggattata gggtaaatga tttggtcgg aacagggggg attttgttg tttcagggga
2151-2210 ttggtctaag ggagaggtga aacgtggac acggtgtcca cccgtgggc atttccggga
2211-2270 tagagtgaag gcgtggcgtt ccatgccgc aggatggga aggcgggtgta
2271-2330 gaaaacagcg agttttagt ttttgggagg aggttggtt aaggagaaat caaggcgggtt
2331-2390 ccaggcaaat tgggcgggtt ggaggtcgc agaccacggt ggctggtttg tgtcagagga
2391-2450 ggaggaggag actgcagcgg tggaggagga gcaagtggag gtgcggagga gaaagagagc
2451-2510 cggtatggta aagaggacgg tgaagaagag gaaagtacaa aggctaaaaat gagaattagg
2511-2537 tttcttgagt ttggtttgtg aagccat

FIG. 12 CONTINUED

AtSQDX-3	ctcatgcatt	tgaccagaac	atcgacgaat	cgcttggtaca	tatgttgctt	catgtacatt	tttaaggt
1-7	ttctcaacca	ttttgcgtcc	ttcactcccc	aatcgtagcc	tctcgtctgg	attcctaagt	
8-67	agatacaaga	gattatgagc	taattctttg	ttaccggatc	tccccattga	gtgaagtaga	
68-127	ccagtcattgt	tgtgttgaac	catctctttg	gttcctcctg	catctgttcc	caccactgca	
128-187	agtccataag	ccattgcttc	gattgtcact	ctaccaaatg	tttcaccaac	tccctgtaaa	
188-247	aatcaagggt	tcaaaaataaa	taaaccgaac	aaaatcgaaa	tggtcaaaac	gaaatcaaaa	
248-307	cctacatttt	gaacaaaaaac	aaaactgaaa	tgttttatcc	aaaaccaaac	tgaatatcaat	
308-367	cacaaattgg	tttatttgat	tcagtaattc	aagttcctat	aaaactgata	aaactaaacc	
368-427	aaaacctaac	tgtaaaactac	tttctagtgg	aaaactgcat	atgcatcaaa	taatgttttt	
428-487	gagggtgtgag	gaggattacc	tgggagtttg	taacgtagac	atctgctgca	gagtataatg	
488-547	aagcaaacacg	ggttgttgca	ggagtccaca	ttaccgactt	agataagttt	ccgctgtttg	
548-607	acaagaagct	taacatctct	ttaacgtatc	caactttgtt	gctctttgaa	cccacggatc	
608-667	ctaaaagaac	tttaagttct	tgcttctctc	ttcttaagcc	attgtcaagt	gtgagagaaa	
668-727	cacttttcat	ctgtcgtgat	gaacctctta	aacgatgttt	gctggagaga	ctaacctttt	
728-787	ctttcctaatt	gatccccttg	tgattccttt	gagattcttg	tcctctctca	gaaagagcca	
788-847	aggcaataga	ttcaaggaga	agaagtgtgc	cctttgttgg	gtttatgctg	ctaagagaca	
848-907	tcacaagcat	atctgaatct	gttattccta	actctgttct	cactgattcg	cgtaatat	
908-967	gtctcttcac	cctcattttc	tctggtgaaa	gtgttggtgt	gttgagtga	gaaggaaatcc	
968-1027	ccgctacaaa	agctaactca	tcattaacag	atagtggaa	aatcactggt	tgtgatctaa	
1028-1087	gctttatatg	ctcctcctcg	caccatgtta	accattgtct	gctctgtgat	tcagataaga	
1088-1147	aatcagcat	tttcactcgg	tcaagaactg	gtttcgtctg	atcaaagtat	tctcgtcgat	
1148-1207	tctccattat	ccaccaagct	attgacttc	caccagctgg	atgatgattc	atgtattgat	
1208-1267							
1268-1327							

FIG. 13

1328-1387 ctgcgagaaa aggaataatt aaaagtaatt aagatatgct ttctcttgat tgtaaattag
1388-1447 tagtctaaaa actgcataat gaattctttac ctatcccatg ggtacacact gctgacacctg
1448-1507 cgatgatcaa atctgctttc atggcagtct tgaagctgag ttctccttg tcttcaacaa
1508-1567 ctttgatcct tctcctactg agctcttgca tcaatccacc tctcctgcta agaactactg
1568-1627 cagagactgt tgcaccacag ctcaaaaagct ctgaagccag ctccatcata gaaattggag
1628-1687 caccagtcat tgatagctcg tggaaaaagca ggacgaatct ccttgaccaa acaaggcgtt
1688-1747 taaaatctga ttctcctgtcg caagtcccag atcttctatg cgggctccat tcaagaactt
1748-1807 tatcctctag tgatccaaaag ggaccaagaa gcttaccata agtagcattt gtcaatggaa
1808-1867 gttgtggatc ttgctcatca tccaaatcct tagtctcaag tacctcttta atcaccttct
1868-1927 gcttaacacg gatcttacta cgagaagtcc ggacagtctt tctcgtcttc tgcttggaac
1928-1987 tcaagctccg tcgagaaaacc ccatcatctt tcttgatcag actaacatcc gtcctcttat
1988-2047 tcgaaccagc atcatcttta ccagtaatat taaccaaacg ctcagaattc tcattagcaa
2048-2107 caacatccag tcctttaatc ttctccatat ataactcatc ctttctcggc ctgacctcaa
2108-2167 accgtaaaaa ctcaactttg ctttcattat catgtgcccc cctagactga acataaaatc
2168-2227 caagatacgt ccaaagcgta atcaaaaagca gccaataaac caaccggcta ctacgaaacc
2228-2287 actgaaacgc tcctcctcca ccatgacctc tacgaggagt cctaccagaa tacactctag
2288-2347 gtgtacccct tggagtagac ctccctgaca gtgaagactt aacacttgct tgtctcagcg
2348-2369 gcgataaccg aatctcctcc at

FIG. 13 CONTINUED

SQD1

```
1  gtcgaccac gcgtccgctc atctctcatc gttccgggag aagagaaagag agacccatcc
61  ctcaattcaa agttcaaaagt ctcgaaaggat cttctccaac tctctctaaa caagattcca
121 aatttttcaaa ggtgaatttg tttgatatagaa tcaagaacaa acctttaaaa tgggcgcatct
181 acttttcagct tcatgccctt cagttatctc acttagcagc agcagcagca agaattcagt
241 taagccgttt gtttcagggc agaccttctt caatgctcag cttctttcaa gatcttctct
301 caaaggactt ctcttccaag agaagaaacc gagaaaaagc tgcgttttca gagcaactgc
361 tgtacctata acccaacaag caccaccga aacatctacc aataactcat cctctaaacc
421 aaagcgtgtt atggtcattg gtggagatgg ttattgcggt tgggctactg ctctccactt
481 gtccaagaag aattacgaag ttgcatgtg tgacaacctt gtaagacgtc ttttcgacca
541 ccagcttgga cttgagtcac tgactcctat tgcctccatt catgaccgaa tcagccgatg
601 gaaggcttg acagggaat caattgagtt gtacgttgggt gatatctgtg atttcgaatt
661 cttagctgag tctttcaagt cttttgagcc ggattcagtt gtccactttg gggaacagag
721 atccgctcct tactcgatga ttgaccggtc cagagcagtt tatacacagc acaacaatgt
781 gattgggact ctcaacgttc tctttgctat aaaagagttt ggagaggagt gtcactttgt
841 aaaacttggg acgatgggtg agtatggaac tccaaatatatt gacatcgagg aaggttatat
901 aaccataacc cacaacggtg gaactgacac tttgccatac cccaagcaag ctagctcctt
961 ttatcatctt agcaaagtcc atgattcgca caacattgct ttactttgca aggcttgggg
1021 tattagagcc actgatctca accaaggagt tgtttatgga gtgaagactg atgagacaga
1081 gatgcatgag gaactccgta accgactgga ttacgatgct gtgtttggtgta cagcacttaa
1141 ccggttctgt gtgcaagctg ctggttggtca cccacttaca gtttatggtgta aaggtggtca
1201 gacgagaggg tacctcgata taagagacac ggttcaatgt gttgagatcg ctatagcaaa
1261 cccggcaaaa gctggtgagt tccgggtctt caaccaattt acagaacagt tttcagtcaa
1321 tgaactggct tcactcgta ctaaagcggg ttcaaagctt gggctagacg tgaaaaagat
1381 gacggtgcct aaccgagag tggaggcaga agaacattac tacaacgcaa agcacactaa
```

FIG. 14

1441 gctgatggaa cttggacttg agcctcacta tctatctgac tcacttcttg attcgttgct
1501 caactttgct gttcagttta aagatcgtgt ggacacgaaa caaatcatgc ctagtgtttc
1561 ctggaagaag attggcgtca agactaagtc catgaccaca **taaa**agtgcag accaatatta
1621 cacataagga gagattatga aagagatgat gtgttgtttg gtatcttcaa acttcatttc
1681 tgcaaaaagac ttgctaggct taagaggttt tgtccatatt acattgtgca ggttctttaa
1741 tgttagatct taatttcgat gaaaaaaaaa aaaaaaaaaa ggcggccgc

FIG. 14 CONTINUED

SQDB

1-25	atggtttctg	cgggtggccc	tgcgctctca	attggctgc	gattcttgta	ttgggtggcg
26-85	ttgttgacaa	cctcgttcgc	cgcaagacag	acgtggaatt	tgcaggtcac	gccgtcacca
86-145	cgatcgcgac	gattgaacgc	cggttgaagg	catggcaaga	gggggttcag	tcctcactc
146-205	gctttgtcaa	tctgactta	gcggtgatt	acgatcgct	aacgggcggg	cagccgatta
206-265	cgcagccgga	tgcgacgtg	cattttgcg	aacagcgcgc	ctgtgcata	ctgctagaaa
266-325	gtgcatggca	taagcgcttc	acggtcaata	acaacgtcaa	cgccccctat	tcaatgaaga
326-385	gcgcctgtgt	ggatgtcggc	ctcaagtccc	acattgtcca	cttgggcacc	atgggcgtct
386-445	atggatacgg	tagccatcgc	ggggctacga	ttcctgaagg	ctacttagaa	gtggaagtgc
446-505	tccagcggga	tggccaaacgc	tttgaagaga	agattcttca	cccgttgat	cgggtagcg
506-565	tctatcacat	gaccaagacg	ctggatcaat	tgttgttcta	ctactacaac	aagaacgaca
566-625	acatccaagt	caccgacctt	caccagggtg	ttgtctgggg	cacgaacacc	gatcactgta
626-685	atctccaccc	ggatctgacc	aatcggttcg	actacgacgg	tgattacggc	acagtcttga
686-745	accgcttctt	gatgcaggcg	gcgatcggct	atcccttgac	tgtgcatggc	gttgggtggcc
746-805	aaacccgagc	cttcatccac	attcgcgact	cagtgcgctg	cgtccaactg	gcgatacgaaa
806-865	atccgcccagc	agccaatgaa	aaagtccgca	tctttaacca	gatgacggaa	acctaccaag
866-925	tcaaggattt	ggcagagaaaa	gtggcgggcat	tgaccgggtgc	tgaaatcgcc	tacctgcccc
926-985	atccacgcaa	ggaagcccctt	gagaacgact	tgattgtcga	caaccgctgc	ttgattgatt
986-1045	taggcctcaa	tccgaccacc	ttggacaatg	gcctgatgag	cgaagtggta	gaaattgcg
1046-1105	agaagtttgc	cgatcgctgc	gatcgcgcca	aaattccctg	cgtttctgcc	tggacccgta
1106-1165	atcaagctga	agctctcagc	gctcctgaaa	ccgctctgcg	ctaa	
1166-1209						

FIG. 15

MAHLLSASCPSVISLSSSSKNSVKPFVSGQTFNAQLLSRSSLKGLLFQEKKPRKSC
VFRATAVPITQQAPPETSTNNSSSKPKRVMVIGGDGYCGWATALHLSKKNYEVCIVDN
LVRRLFHQGLGLESITPIASIHDRISRWKALTGKSIELYVGDI CDFFFLAESFKSFEP
DSVHFGEQRSAPYSMIDRSRAVYTQHNNVIGTLNVLF AIKEFGECHLVKLGTMGEY
GTPNIDIEEGYITITHNGRTDTLPYPKQASSFYHLSKVHDSHNI AFTCKAWGIRATDL
NQGVYGVKTDETEMHEELRNRLDYDAVFGTALNRFVCVQAAVGHPLTVYKGQGQTRGY
LDIRDTVQCVEIAIANPAKAGEFRVFNQFTEQFSVNELASLVTKAGSKLGLDVKKMTV
PNPRVEAEEHYYNKHTKLMELGLEPHYLSDSLLNFAVQFKDRVDTKQIMPSVS
WKKIGVKTksMTT

FIG. 16

MRIALFTETFLPKVDGIVTRLRHTVDHLQRLGHTVMVFCPDGGLREHKGARVYGVKGF
PLPLYPELKLAFPLPKVGKALERFRPDLIHVVNPAVLGLGGIYYAKALNVPLVASYHT
HLPKYLEHYGLGVLEGLWELLKLAHNQAAINLCTSTAMVQELTDHGIEHCCLWQRGV
DTETFRPDLATAAMRDRLSGGKPTAPLLLYVGRLSAEKQIDRLRPILDANPEACLALV
GDGPHRAELEQLFAGTQTQFIGYLLHGEQLGAAAYASADAFVFPSTETLGLVLLLEAMAA
GCPVVAANS GGIPDIVSDGINGFLFDPED EQGAIAAIQRLLANPAEREILLRQAARQEA
ERWSWNAATRQLQDYCEVLADGCLPLAA

FIG. 17

MKILVLGGDGCWPCALNLAAAGHAVTIVDNLVRRKTDVELGVQSLTPIATIERRLK
AWQETGGQPISEFVNLDLAADYDRLCALLLETQPDIVHFAEQRAAPYSMKSAWHKRFT
VNNNVNATHNLLCACVDVGLKSHIVHLGTMGVYGYGSHRGATIPGYLEVEVVQRDGQ
RFEEKILHPVDPGVSVMHTKTLDDQLLFYYNKNNDNIQVTDLHQGIWGTNTDHCNLHP
DLTNREFYDGDYGTVLNRFMLQAAIGYPPLTVHGVGGQTRAFIHIRDSVRCVQLAIENP
PAANEKVRIFNQMTETYQVKDLAEKVAALTGAELIAYLPNPRKEALENDLIVDNRCCLID
LGLNPTTLDNGLMSEVVEIAQKFFADRCDRAKIPCVSAWTRNQAEALSAPETALR

FIG. 18